SEQUENCE LISTING **IAP8 Rec'd PCT/PTO 02 DEC 2005**

<110> THE GOVERNMENT OF THE UNITED STATES OF AMERICA AS
      REPRESENTED BY THE SECRETARY OF THE DEPARTMENT OF HEALTH AND
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<120> GAMMA PGA CONJUGATES FOR ELICITING IMMUNE RESPONSES DIRECTED
      AGAINST BACILLI

<130> 4239-68226-01

<150> US 60/476,598
<151> 2003-06-05

<160> 3

<170> PatentIn version 3.2

<210> 1
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<213> Artificial Sequence

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Leu Val Ser Ser Thr Gly Asn Leu Glu Val Ile Gln Ala Glu Val Lys
                20   25   30

cag gag aac cgg tta tta aat gaa tca gaa tca agt tcc cag ggg tta   144
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1

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        cta gga tac tat ttt agt gat ttg aat ttt caa gca ccc atg gtg gtt      192
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        acc tct tct act aca ggg gat tta tct att cct agt tct gag tta gaa      240
        Thr Ser Ser Thr Thr Gly Asp Leu Ser Ile Pro Ser Ser Glu Leu Glu
        65                      70                      75                  80

        aat att cca tcg gaa aac caa tat ttt caa tct gct att tgg tca gga      288
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        ttt atc aaa gtt aag aag agt gat gaa tat aca ttt gct act tcc gct      336
        Phe Ile Lys Val Lys Lys Ser Asp Glu Tyr Thr Phe Ala Thr Ser Ala
                        100                     105                     110

        gat aat cat gta aca atg tgg gta gat gac caa gaa gtg att aat aaa      384
        Asp Asn His Val Thr Met Trp Val Asp Asp Gln Glu Val Ile Asn Lys
                        115                     120                     125

        gct tct aat tct aac aaa atc aga tta gaa aaa gga aga tta tat caa      432
        Ala Ser Asn Ser Asn Lys Ile Arg Leu Glu Lys Gly Arg Leu Tyr Gln
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        ata aaa att caa tat caa cga gaa aat cct act gaa aaa gga ttg gat      480
        Ile Lys Ile Gln Tyr Gln Arg Glu Asn Pro Thr Glu Lys Gly Leu Asp
        145                     150                     155                 160

        ttc aag ttg tac tgg acc gat tct caa aat aaa aaa gaa gtg att tct      528
        Phe Lys Leu Tyr Trp Thr Asp Ser Gln Asn Lys Lys Glu Val Ile Ser
                        165                     170                     175

        agt gat aac tta caa ttg cca gaa tta aaa caa aaa tct tcg aac tca      576
        Ser Asp Asn Leu Gln Leu Pro Glu Leu Lys Gln Lys Ser Ser Asn Ser
                        180                     185                     190

        aga aaa aag cga agt aca agt gct gga cct acg gtt cca gac cgt gac      624
        Arg Lys Lys Arg Ser Thr Ser Ala Gly Pro Thr Val Pro Asp Arg Asp
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        aat gat gga atc cct gat tca tta gag gta gaa gga tat acg gtt gat      672
        Asn Asp Gly Ile Pro Asp Ser Leu Glu Val Glu Gly Tyr Thr Val Asp
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        gtc aaa aat aaa aga act ttt ctt tca cca tgg att tct aat att cat      720
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        gaa aag aaa gga tta acc aaa tat aaa tca tct cct gaa aaa tgg agc      768
        Glu Lys Lys Gly Leu Thr Lys Tyr Lys Ser Ser Pro Glu Lys Trp Ser
                        245                     250                     255

        acg gct tct gat ccg tac agt gat ttc gaa aag gtt aca gga cgg att      816
        Thr Ala Ser Asp Pro Tyr Ser Asp Phe Glu Lys Val Thr Gly Arg Ile
                        260                     265                     270

        gat aag aat gta tca cca gag gca aga cac ccc ctt gtg gca gct tat      864
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2

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             290                      295                      300

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         aat act tct aca agt agg aca cat act agt gaa gta cat gga aat gca       1008
         Asn Thr Ser Thr Ser Arg Thr His Thr Ser Glu Val His Gly Asn Ala
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         gaa gtg cat gcg tcg ttc ttt gat att ggt ggg agt gta tct gca gga       1056
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         gat aca gca aga tta aat gcc aat att aga tat gta aat act ggg acg       1200
         Asp Thr Ala Arg Leu Asn Ala Asn Ile Arg Tyr Val Asn Thr Gly Thr
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         gct cca atc tac aac gtg tta cca acg act tcg tta gtg tta gga aaa       1248
         Ala Pro Ile Tyr Asn Val Leu Pro Thr Thr Ser Leu Val Leu Gly Lys
                             405                      410                      415

         aat caa aca ctc gcg aca att aaa gct aag gaa aac caa tta agt caa       1296
         Asn Gln Thr Leu Ala Thr Ile Lys Ala Lys Glu Asn Gln Leu Ser Gln
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         ata ctt gca cct aat aat tat tat cct tct aaa aac ttg gcg cca atc       1344
         Ile Leu Ala Pro Asn Asn Tyr Tyr Pro Ser Lys Asn Leu Ala Pro Ile
                             435                      440                      445

         gca tta aat gca caa gac gat ttc agt tct act cca att aca atg aat       1392
         Ala Leu Asn Ala Gln Asp Asp Phe Ser Ser Thr Pro Ile Thr Met Asn
             450                      455                      460

         tac aat caa ttt ctt gag tta gaa aaa acg aaa caa tta aga tta gat       1440
         Tyr Asn Gln Phe Leu Glu Leu Glu Lys Thr Lys Gln Leu Arg Leu Asp
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         acg gat caa gta tat ggg aat ata gca aca tac aat ttt gaa aat gga       1488
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         aga gtg agg gtg gat aca ggc tcg aac tgg agt gaa gtg tta ccg caa       1536
         Arg Val Arg Val Asp Thr Gly Ser Asn Trp Ser Glu Val Leu Pro Gln
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         att caa gaa aca act gca cgt atc att ttt aat gga aaa gat tta aat       1584
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3

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      acg act aaa ccg gat atg aca tta aaa gaa gcc ctt aaa ata gca ttt        1680
      Thr Thr Lys Pro Asp Met Thr Leu Lys Glu Ala Leu Lys Ile Ala Phe
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      gga ttt aac gaa ccg aat gga aac tta caa tat caa ggg aaa gac ata        1728
      Gly Phe Asn Glu Pro Asn Gly Asn Leu Gln Tyr Gln Gly Lys Asp Ile
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      acc gaa ttt gat ttt aat ttc gat caa caa aca tct caa aat atc aag        1776
      Thr Glu Phe Asp Phe Asn Phe Asp Gln Gln Thr Ser Gln Asn Ile Lys
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      aat cag tta gcg gaa tta aac gca act aac ata tat act gta tta gat        1824
      Asn Gln Leu Ala Glu Leu Asn Ala Thr Asn Ile Tyr Thr Val Leu Asp
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      aaa atc aaa tta aat gca aaa atg aat att tta ata aga gat aaa cgt        1872
      Lys Ile Lys Leu Asn Ala Lys Met Asn Ile Leu Ile Arg Asp Lys Arg
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      ttt cat tat gat aga aat aac ata gca gtt ggg gcg gat gag tca gta        1920
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      gtt aag gag gct cat aga gaa gta att aat tcg tca aca gag gga tta        1968
      Val Lys Glu Ala His Arg Glu Val Ile Asn Ser Ser Thr Glu Gly Leu
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      ttg tta aat att gat aag gat ata aga aaa ata tta tca ggt tat att        2016
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      gta gaa att gaa gat act gaa ggg ctt aaa gaa gtt ata aat gac aga        2064
      Val Glu Ile Glu Asp Thr Glu Gly Leu Lys Glu Val Ile Asn Asp Arg
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      tat gat atg ttg aat att tct agt tta cgg caa gat gga aaa aca ttt        2112
      Tyr Asp Met Leu Asn Ile Ser Ser Leu Arg Gln Asp Gly Lys Thr Phe
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      ata gat ttt aaa aaa tat aat gat aaa tta ccg tta tat ata agt aat        2160
      Ile Asp Phe Lys Lys Tyr Asn Asp Lys Leu Pro Leu Tyr Ile Ser Asn
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      ccc aat tat aag gta aat gta tat gct gtt act aaa gaa aac act att        2208
      Pro Asn Tyr Lys Val Asn Val Tyr Ala Val Thr Lys Glu Asn Thr Ile
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      att aat cct agt gag aat ggg gat act agt acc aac ggg atc aag aaa        2256
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Gln Glu Asn Arg Leu Leu Asn Glu Ser Glu Ser Ser Gln Gly Leu
        35                  40                  45


Leu Gly Tyr Tyr Phe Ser Asp Leu Asn Phe Gln Ala Pro Met Val Val
    50                  55                  60


Thr Ser Ser Thr Thr Gly Asp Leu Ser Ile Pro Ser Ser Glu Leu Glu
65                  70                  75                  80


Asn Ile Pro Ser Glu Asn Gln Tyr Phe Gln Ser Ala Ile Trp Ser Gly
                85                  90                  95


Phe Ile Lys Val Lys Lys Ser Asp Glu Tyr Thr Phe Ala Thr Ser Ala
                100                 105                 110


Asp Asn His Val Thr Met Trp Val Asp Asp Gln Glu Val Ile Asn Lys
            115                 120                 125


Ala Ser Asn Ser Asn Lys Ile Arg Leu Glu Lys Gly Arg Leu Tyr Gln
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Ile Lys Ile Gln Tyr Gln Arg Glu Asn Pro Thr Glu Lys Gly Leu Asp
145                 150                 155                 160


Phe Lys Leu Tyr Trp Thr Asp Ser Gln Asn Lys Lys Glu Val Ile Ser
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Ser Asp Asn Leu Gln Leu Pro Glu Leu Lys Gln Lys Ser Ser Asn Ser
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5

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Glu Lys Lys Gly Leu Thr Lys Tyr Lys Ser Ser Pro Glu Lys Trp Ser
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Thr Ala Ser Asp Pro Tyr Ser Asp Phe Glu Lys Val Thr Gly Arg Ile
            260             265             270

Asp Lys Asn Val Ser Pro Glu Ala Arg His Pro Leu Val Ala Ala Tyr
            275             280             285

Pro Ile Val His Val Asp Met Glu Asn Ile Ile Leu Ser Lys Asn Glu
    290             295             300

Asp Gln Ser Thr Gln Asn Thr Asp Ser Gln Thr Arg Thr Ile Ser Lys
305             310             315             320

Asn Thr Ser Thr Ser Arg Thr His Thr Ser Glu Val His Gly Asn Ala
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            340             345             350

Phe Ser Asn Ser Asn Ser Ser Thr Val Ala Ile Asp His Ser Leu Ser
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Leu Ala Gly Glu Arg Thr Trp Ala Glu Thr Met Gly Leu Asn Thr Ala
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Asp Thr Ala Arg Leu Asn Ala Asn Ile Arg Tyr Val Asn Thr Gly Thr
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Ala Pro Ile Tyr Asn Val Leu Pro Thr Thr Ser Leu Val Leu Gly Lys
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Asn Gln Thr Leu Ala Thr Ile Lys Ala Lys Glu Asn Gln Leu Ser Gln
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Ile Leu Ala Pro Asn Asn Tyr Tyr Pro Ser Lys Asn Leu Ala Pro Ile
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6

Ala Leu Asn Ala Gln Asp Asp Phe Ser Ser Thr Pro Ile Thr Met Asn
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Tyr Asn Gln Phe Leu Glu Leu Glu Lys Thr Lys Gln Leu Arg Leu Asp
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Thr Asp Gln Val Tyr Gly Asn Ile Ala Thr Tyr Asn Phe Glu Asn Gly
                485   490   495

Arg Val Arg Val Asp Thr Gly Ser Asn Trp Ser Glu Val Leu Pro Gln
            500   505   510

Ile Gln Glu Thr Thr Ala Arg Ile Ile Phe Asn Gly Lys Asp Leu Asn
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Thr Glu Phe Asp Phe Asn Phe Asp Gln Gln Thr Ser Gln Asn Ile Lys
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Asn Gln Leu Ala Glu Leu Asn Ala Thr Asn Ile Tyr Thr Val Leu Asp
        595   600   605

Lys Ile Lys Leu Asn Ala Lys Met Asn Ile Leu Ile Arg Asp Lys Arg
    610   615   620

Phe His Tyr Asp Arg Asn Asn Ile Ala Val Gly Ala Asp Glu Ser Val
625   630   635   640

Val Lys Glu Ala His Arg Glu Val Ile Asn Ser Ser Thr Glu Gly Leu
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Leu Leu Asn Ile Asp Lys Asp Ile Arg Lys Ile Leu Ser Gly Tyr Ile
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Val Glu Ile Glu Asp Thr Glu Gly Leu Lys Glu Val Ile Asn Asp Arg
    675   680   685

7

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Ile Asp Phe Lys Lys Tyr Asn Asp Lys Leu Pro Leu Tyr Ile Ser Asn
705             710             715                 720

Pro Asn Tyr Lys Val Asn Val Tyr Ala Val Thr Lys Glu Asn Thr Ile
            725             730                 735

Ile Asn Pro Ser Glu Asn Gly Asp Thr Ser Thr Asn Gly Ile Lys Lys
            740             745                 750

Ile Leu Ile Phe Ser Lys Lys Gly Tyr Glu Ile Gly
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